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Original Articles.

CHORDOMA.

By ERNEST M. DALAND, M.D., BOSTON.

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THE nuclei pulposi, in the centers of the intervertebral discs of infants, are the only remnants of the embryonic notochord normally found in the human being. The notochord, of entodermal origin, is the foundation upon which the bodies of the vertebrae are built. Notochordal tissue is at first made up of epithelial cells. Vacuoles develop in these cells. A certain amount of mucin then forms in the vacuoles but later breaks through the cell walls. The result is the formation of a vacuolated syncytium, suspended in a gelatinous matrix. The vacuolation somewhat resembles that seen in chondromata.

H. Müller has shown that other remnants of the notochord are frequently found at post-mortem—chiefly at the base of the skull and on the coccyx. Virchow describes a series of such growths under the name of echondrosis physalifera, considering the vacuolation that of chondromata. Ribbert proved that they were the proliferated remains of the notochord. In 2% of a series of cases, he found remnants in

the bony tissue beneath the dura of the clivus Blumenbachi,—that portion of the sphenoid bone which is continuous with the basilar groove of the occipital bone. Ribbert further demonstrated pedicles connecting them with the bone, within which there was similar tissue. Growths of this nature have also been demonstrated on the dorsum sellae, the hypophysial fossa, and more rarely, on the sacrum.

Hence these notochordal tumors or chondromata have, until recently, been mere pathological curiosities. With the reporting of several malignant chondromata, their clinical significance has become of more importance. In a malignant chordoma, the cells tend to differentiate into the syncytial type of vacuolated cells, which are typical of adult notochordal tissue. Usually foetal, adult, and intermediate types are to be found in the same tumor.

But 16 cases of chordoma have been reported clinically. Of these, ten had their origin at the base of the skull; one sprang from the anterior surface of a cervical vertebra, while the other five appeared in the sacro-coccygeal region. When the tumors appeared at the base of the skull, death usually followed a history of cranial nerve disturbances with pressure symptoms. One case was operated upon and did not recur, this being the only successful radical operation in this group. In one other case suffi-

cient material for diagnosis was curetted out, and the patient was alive at the time of writing. The case in which the chordoma appeared in the cervical region resulted in death from pressure on the cord.

Of the five sacro-coccygeal cases, in all of which there was pressure on the rectum, one was operated upon without recurrence, one was removed only to recur and cause death, while the others were operated upon twice each but all ended fatally. None of the tumors metastasized; but invasion of the rectum or of the bones of the skull was frequently observed.

Grahl was the first to report a case giving clinical symptoms. His patient was a 51-year-old woman who developed difficulty in swallowing and an impediment in speech. Paralysis of the third, sixth, and seventh cranial nerves followed and, after three years, she died with symptoms of bulbar paralysis. At autopsy the tumor was found to be a lobulated extradural mass, springing from the sella turcica and connected with the latter by a pedicle 4 cm. long. The tumor, $9 \times 3.5 \times 3.5$ cm., was a soft, jelly-like mass, definitely circumscribed and covered with dura.

Fischer and Steiner's case was a 17-year-old girl, who complained of difficulty in moving her head and of pain in her neck. Paralysis of the left arm and leg developed, accompanied by a contracture of the left hand. Later there was a complete right sided paralysis, together with a double ankle clonus and double choked disc. Autopsy revealed a tumor arising from beneath the dura of the clivus Blumenbachii and extending backward to the second cervical vertebra. The spinal canal was invaded and the cord compressed.

Klebs' case was the first one to be reported in which the chordoma did not lie at the base of the skull. In this case, the tumor sprang from the anterior aspect of a cervical vertebra. Pressure on the medulla and cord caused death.

Linek: A middle aged man presented a mass in the left side of the roof of the mouth and posterior pharyngeal wall, not affecting the mucous membrane. Later there were symptoms of a tumor at the base with paralysis of the sixth, partial paralysis of the seventh, and slight involvement of the eighth nerves, all on the left. There was loss of the sense of taste in the left side of the tongue and complete loss of sensation in the left pharynx, larynx, and tongue. Involvement of the tenth and eleventh

nerves was indicated by a left recurrent laryngeal paralysis and paralysis of the sternomastoid and upper trapezius muscles. The left half of the tongue was atrophied and protruded to the left. Reflexes were normal. Diagnosis in this case was made by exploratory puncture with removal of specimen.

Frenkel and Bassall described a tumor extending from the foramen magnum to the optic foramina with the destruction of the sella turcica, much of the ethmoids, invasion of the sinuses, and final extension of the tumor into both nasal cavities. The tumor, covered with dura, entangled the third nerve and pressed on the optic nerves. The patient was 39 years old.

Seiffer's patient of 33 years for four years had had severe pain in the back of her head, occasional vomiting and attacks of dizziness. There was no choked disc but there was a slight left sided paresis. Death was sudden, with symptoms of collapse. Postmortem examination revealed a chordoma at the foramen magnum, growing out of the base of the skull and pressing on the medulla. The tumor was soft and nodular, about the size of a large chestnut.

Wegelin: A woman of 25 years died with bulbar symptoms. Autopsy showed a 5×3 cm. tumor, the origin of which was well behind the end of the clivus. The tumor was tightly packed in front of the foramen magnum and was covered over with dura. It had grown around the left hypoglossal nerve and had flattened the pons and medulla. The inner half of the clivus was nearly replaced by the tumor mass, which extended forward to the tonsil.

Eitel: A 44-year-old man died with symptoms of a brain tumor. Examination showed a $4.8 \times 4.5 \times 3$ cm. tumor, starting from the clivus and breaking through its dural covering. The pons was flattened and compressed. Tumor cells were found in the bony structure of the clivus.

Hässner: A 32-year-old man noticed pressure symptoms for four years. Dizziness and diplopia were his first complaints. Later he developed double choked discs, severe pain in his head, and finally a right sided paralysis of the sixth nerve. Lumbar puncture showed the spinal fluid to be under increased pressure. He was found dead in bed. The tumor lay beneath the temporal lobe on the right, extending forward to the frontal lobe, and practically filling the right middle fossa. The optic chiasma, right olfactory and abducens nerves were pushed over

and surrounded by the tumor tissue, but not invaded. The right half of the brain, particularly the pons, was pushed over and flattened.

Jelliffe and Larkin had a patient with paralysis of the second, third, fourth, sixth, seventh (partial), eighth, and twelfth nerves. There was a left hemiplegia with positive Babinskis. Symptoms began with dizziness and ended with delirium, incontinence, and bleeding from the nostrils. At autopsy the tumor was extradural, 11x6x7 cm., and extended from the olfactory bulbs to the pons and medulla. There was pressure on the olfactory and optic nerves. The third, fourth, fifth, and sixth nerves were embedded in the tumor mass. Part of the fibers of the seventh nerve were involved but the eighth appeared intact.

Alezais and Peyson: A woman of 68 noticed a swelling in the left superior occipital region but did not consult a doctor for about eight months. The tumor, then about the size of a large orange, was relatively movable in the transverse diameter and slightly in the vertical. She complained of pain in her neck, referred to her shoulders and between the scapulae. The tumor was removed and at operation a perforation of the occipital bone as large as a dime was noted. This was probed without any ill effects but no pedicle was found. The patient's symptoms cleared up entirely after the operation. Examination of the tumor showed a nodular mass, circumscribed by a capsule. Microscopic examination showed it to be a chordoma.

Feldman reported a woman of 46 who had a tumor arising from the sacrum and lying behind the rectum, producing pressure symptoms on the rectum. A tumor of the chordoma type and the size of an apple was removed by operation, but recurred and was again removed 20 months later. Two years after, there was a second recurrence which was inoperable and death followed.

Mazzia: A man of 54, who for 18 years had a slight amount of pain and feeling of discomfort in the sacro-coccygeal region, was operated upon. Removal of the coccyx revealed a tumor 17x8 cm., surrounded by a fibrous capsule. This was excised, but 19 months later there was a recurrence and a secondary operation with resection of the sacrum. A further recurrence at the end of two years was deemed inoperable.

Albert: In this case the growth of a chordoma apparently followed a fall as a result of which the patient, a man of 26, had his head

and back injured. He complained of an aching about the region of the coccyx which began to get worse at the end of nine weeks. Then, for the first time, the pain was accentuated on defecation. The tumor two-thirds occluded the lumen of the rectum and was not adherent to the vertebrae. Four months after removal, the tumor recurred and this time invaded the rectum. Three inches of the involved rectal wall were removed in a second operation but the mass again recurred, this time sooner than before. A colostomy was done but the patient died six weeks later—only 14 months after the discovery of the tumor. Examination of the mass removed at the first operation showed a tumor, 10x6x5 cm., of the chordoma type. The submucosa of the intestine was slightly involved in one area, but the muscularis was extensively invaded.

Curtis and Lefort: A man of 58 had had a tumor of the coccyx for four years. The tumor, 10x6 cm., lay on the anterior surface of the sacrum and coccyx and was removed along with the coccyx. There was a recurrence and death ensued two and a half years afterward. Histological examination showed tissue of the notochordal type with vacuolated cells predominating.

De Bernardi describes a case of what he calls "sarcomatous chordoma of the sacrum." A man of 56, who for two months had been troubled with pain in the sacro-coccygeal region, showed on examination an ulcerated tumor, extending from the anus upward along the sacrum. It was adherent to the sacrum, but not to the coccyx, although the lower part produced the most severe symptoms by pressure on the rectum. There was no glandular involvement and the tumor was removed without further recurrence. Grossly, the tumor was made up of two parts, an "intrapelvic" portion and a "retrococcygeal" portion. The intrapelvic portion was lobulated, soft, and gelatinous. This tissue was notochordal in type with vacuolated cells and a homogeneous granular cytoplasm. The other portion, united by a pedicle, was hard and microscopically showed sarcoma cells with many mitotic figures. There were also some notochordal cells within the sarcomatous tissue.

The case here mentioned is the 17th case to be reported. The clinical course of the tumor is similar to that of several others which ter-

minated fatally, although this patient is alive at the time of writing.

A white, single, female domestic of 30 entered the Massachusetts General Hospital on June 18, 1918, complaining of hoarseness, headache, and a swelling in the right side of the neck.

F.H. Negative.

P.H. No previous illness or operations. Cardio-respiratory, gastro-intestinal, and genito-urinary negative.

Habits. Occasional beer and wine, three to four cups coffee daily.

Present illness. Three years ago the patient suddenly became hoarse without any apparent cause. The hoarseness cleared up in three days and there was no further trouble for a year.

Two years ago a severe headache developed and the hoarseness re-appeared. Both symptoms rapidly became worse. Eight months later an osteopath was consulted. While he was manipulating her head and neck she heard something snap in her neck. For 24 hours she was unable to turn her head. Two days later a swelling appeared in the right postcervical region. The osteopath tried in vain to remove the mass by massage. Tinnitus was noticed in the right ear soon after this and it has persisted.

One year ago the patient's right clavicle became more prominent and she was unable to lift her arm laterally over her head. The hoarseness continued, being accompanied by a productive cough, the sputum being more abundant in the a.m., but never bloody. The headache has never been localized, but always, as a feeling of increased pressure, has been more severe in the a.m. or on lying down. The mass in the right postcervical region has increased in size and has at times been painful. Partial deafness in the right ear appeared one month ago and the tinnitus increased. There has never been any vertigo. Recently she has been nauseated frequently and has vomited occasionally, more in the morning.

P.E. A tall, fairly well developed and nourished woman. Her voice is somewhat husky.

Neurological Reflexes. Pupils equal and regular, reacting normally to light and distance. Knee jerks, Achilles jerks, epigastrics, and abdominals present and normal. No Babinski.

Cranial Nerves.

I. Subjectively, some impairment of smell.

II. Right eye—vision normal. Examination

of the eye grounds shows an old choked disc with connective tissue changes. The choked disc has subsided somewhat, leaving the marked connective tissue changes. Left eye—Vision slightly reduced. Fundus shows slight papillary edema.

III to VI. Normal.

VIII. Right ear, hearing somewhat impaired. Loss of anatomical landmarks of canal and middle ear. Bulging in anterior inferior region of canal. Marked anaesthesia of drum. Left ear normal. Examination of static labyrinth negative.

IX. Right side of tongue is distinctly anaesthetic.

X. Complete paralysis of right vocal cord (recurrent laryngeal).

XI. Loss of power in right sternomastoid and upper portion of trapezius muscles, so that right trapezius drops and the clavicle is prominent.

XII. Atrophy of right side of tongue with limited motion of the tongue to the right.

Nose. Unobstructed. Septum intact.

Mouth. Upper teeth false. Lower canines and incisors present, others absent. Right tonsil large and depressed inward.

Neck. No glandular or thyroid enlargement.

Heart. Normal sounds, rhythm, and rate.

Lungs. Normal.

Abdomen and Extremities not remarkable.



FIG. 1.—Showing location of tumor, with scar of operation.

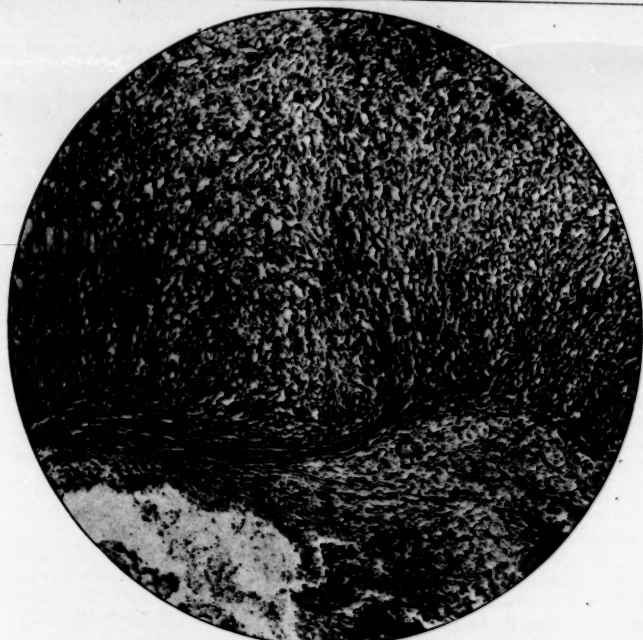


FIG. 2.—Showing the syncytial cell masses with large vacuoles and (below) the adult type of cells. $\times 100$.

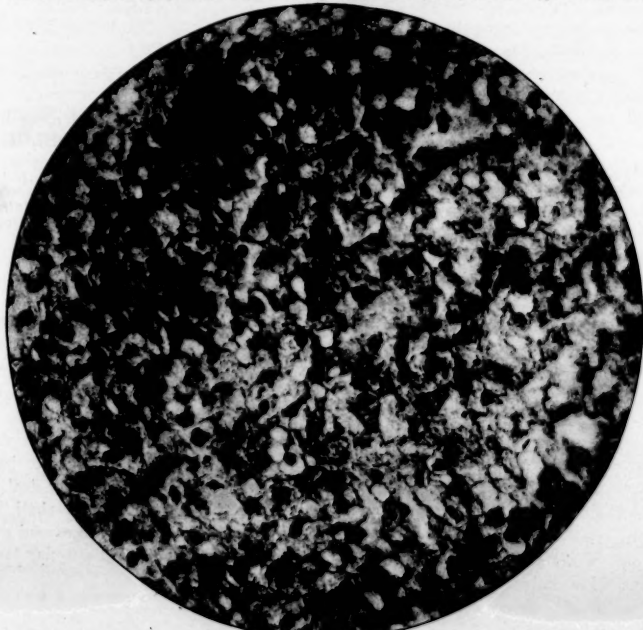


FIG. 3.—Showing the large cells containing vacuoles. $\times 500$.

Local. There is a tumor mass the size of a hen's egg behind and slightly below the right ear, extending downward on the neck and backward nearly to the median line. The mass is firm, non-tender, and non-fluctuant. The right ear is slightly pushed forward by the mass, as is the wall of the auditory canal. There is also pressure on the right tonsil.

OPERATION.

June 26. Dr. C. A. Porter. Ether anesthesia. "Curetting tumor at base of skull." Incision made over growth and colloid like material curetted out with free hemorrhage. Curette passed upwards and inwards and large masses of material obtained. The greater part of the base of the skull was denuded and the base bone felt everywhere. Bleeding gradually ceased. Rubber dam wick inserted. Dry dressing.

Wick removed in 24 hours. Healing by first intention.

June 29. Patient has vomited for three days since operation. She coughs and then vomits and is unrelieved by gastric lavage or by medication.

July 1. The vomiting has ceased. Hoarseness remains as before operation.

July 10. Headache has entirely cleared up. No change in hoarseness. She has had two massive x-ray treatments since operation. Discharged relieved.

Seven months after the operation a letter from the patient states that her headaches have entirely disappeared. There is a recurrence of the mass in her neck and she has some pain. She has had five x-ray treatments. Her other symptoms are as on leaving the hospital.

PATHOLOGICAL EXAMINATION OF CURETTINGS.

Fragments of soft, friable, grayish white, somewhat translucent tissue, suggesting in its appearance and size the fragments of a hydatidiform mole. Microscopic sections from the fragments show a tumor, the cells of which tend to differentiate like those of the notochord. Much of its structure is of the embryonic type and resembles mucous connective tissue. It is composed of syncytial cell masses which often contain vacuoles with an abundant supply of homogeneous, blue staining, mucinous-like, intercellular substance. Other areas resemble the

adult structure of the notochord and show large cells containing vacuoles of various sizes. There are various intermediate forms of cells between these two types.

SUMMARY.

1. Remnants of the notochord are frequently found at post-mortem without having caused clinical symptoms.
2. 17 cases of tumors of notochordal tissue which have given clinical symptoms are recorded. 12 of these are over the upper end and five over the lower end of the neural canal.
3. Two of the 17 cases have been successfully operated on. Death followed in the others.
4. The case cited is the 17th case of chordoma. Although still showing involvement of several cranial nerves, the patient is still alive.

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THE CANCER PROBLEM.*

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My purpose in attempting to discuss the great economic as well as medical problem of cancer is not that I have any new knowledge to offer, but that I may be able, from a review of the literature and from recent communications from some of our most prominent workers, to bring the entire subject before you in an up-to-date summary, that it may be of service to you who have neither the time nor the opportunity to study minutely this baneful disease with which you must daily deal. As there are many laymen present, I shall, purposely, seek to avoid technical phrases and confine myself to more pleasing and popular language.

* Read before the Thurber Medical Society of Milford, Mass., April 3, 1919, but subsequently divided into two papers, viz.: "The Cancer Problem" and "Radio-therapy."

Cancer is as old as the Pyramids. All mankind, both king and slave, has known its nauseous and painful spell. One hundred and eighty years before Christ, Leonidis described retraction of the nipple as a diagnostic sign. Hippocrates, Celsus, and Galen, all had knowledge of the malignant disease.

An army of brilliant, faithful men—some of the masterminds of our art—with ample means and material at their command, have labored for years with the cancer problem. After a review of their various theories and conclusions, I am presenting the facts which are pretty much agreed upon.

As far as we know, cancer is neither hereditary, infectious, or communicable. Mid-life, or from forty-five on, is the cancer zone. This is the time when body growth is fully established. It is the hilltop of the journey of life. The perfect physical balance and the poise of youth no longer avail. The intake now exceeds the output. Habits become more sedentary and the emanatories less active. It is a zone of lowered resistance, for the slowed-up metabolism begins to display the affections of imperfect oxidation and hypernutrition. Hence it is that cancer is found rather more prevalent among those of easy circumstances and those subject to gluttony and indolence.

At this susceptible and unhealthful period some form of chronic irritation prevails. In a general way this may refer to improper habits of living, and in a more definite sense to a eragid tooth or a broken or ill-fitting dental plate as of the tongue, or the hot pipe stem as of the lip, or a pigmented mole as of the skin, or trauma as of the breast, or excessive hot drinks as of the stomach, or an ulcerated cervix as of the uterus, or a combination of circumstances and influences, or it may be undeterminable.

This constant or intermittent irritation, acting on a normal body cell in a pliant, non-resistant stage in its life cycle, causes an inherent alteration in its nature. It ceases to be in harmonious function with its fellow cells. It becomes lawless, for it no longer respects the rules and regulations which govern normal tissues. It does not seek to dissuade other cells to join its lawless band, but it rapidly procreates its own kind, and thus an embryonic tissue develops, pressing in every direction with ever-increasing bulk, thereby rendering the resisting tissues enfeebled by anemia till they

yield to the unequal combat. The invasion goes steadily, and at times rapidly, on to malignant victory, aided and abetted by the channels of lymph and the rivers of blood.

Nor is this the entire story of disaster. This lawless cell receives aid from without. Whatever acts against general health and thereby lowers the resistance of the resisting cells gives the invader succor. Among these we may briefly name in a general way, bad hygiene and ventilation, excesses of all kinds, alcohol, syphilis, and tobacco. Something in our way of living gives aid, from without, to the development and growth of cancer, for its increase seems to keep pace with modern civilization.

The vandal aid must receive aid from without, because it is of itself a weakling and by nature deficient, for it requires only one-half the amount of radiant energy to destroy it utterly that it requires to prostrate the normal cell. It is, therefore, only when from one cause or another, or a multitude of causes, that the resistance becomes lowered that this cell is able to exercise its pernicious nature and set out in its mad career.

In the space allotted I shall not attempt any differentiation between the varieties of so-called cancer of different degrees of malignancy. The hard and fast line, formerly drawn between benign and malignant growths, no longer prevails. The attempt is no longer made to separate the sheep from the goats, for it is safer to call them all goats and be done with it. Why, then, be inquisitive? Why seek knowledge that may give a false sense of security when the obtaining of this useless knowledge jeopardizes the life of the patient? A new surgical commandment has been written—"Thou shalt not touch Nature's resistant wall." Some surgeons have now come to regard the once pervading custom of removing a portion of the cancer or euvecting the bleeding uterus for histological examination as attended with peril, because it opens Nature's resistant and protecting capsules and gives the desired opportunity for metastasis along the lymph and blood channels. The benign growth is no longer regarded as trustworthy, but as a suspicious character to be taken into custody before it becomes guilty of that grave misdeed—malignancy.

To discover the invading cancer cell early has been called "the heart of the cancer problem." An almost world-wide propaganda has

been instituted to inform the people of an early recognition of precancerous symptoms, and physicians have been urged to be more on the lookout and quicker to act even while danger lurks afar off. The fruition of these teachings has not yet appeared, for while all other diseases are perceptibly on the decline cancer seems, to many observers, to be increasing the world over. Eighty thousand, annually, in our own land, fall victims to this vicious cell. The fiendish mystery of stench and pain suffered by these victims clothes these figures with horror.

As an evidence of the difficulties attending the propagation of this vital knowledge, I relate the following pitiable but startling facts. In a series of investigations into the history of inoperable cases, it was found, in 400 such analyses, that the patient waited, on an average, 14 months after the cancer was visible before consulting the family physician; and he, in turn, waited with this same visible cancer under observation an average of thirteen months. In these cases the lawless cell had had at least three years to run its wild riot unchecked, yes, unopposed.

In the early days of my practice, I was called to attend a fleshy, middle-aged lady. That day her husband, scenting a nauseous odor, was about to call a plumber and investigate the cause, as the stench could no longer be endured, when the wife disclosed the fact that she had suffered, in silence, two years with a hideous cancer gnawing at her vitals. In six months time she paid the full penalty of her reticence and delay.

How do such things happen? If you extend this query to the cases cited above, a very few will tell you that as there was no pain they thought there was no peril. An equal number will tell you that the dread of an operation alarmed them to such a degree that they elected death. But the great majority will tell you that, from the very first, they believed themselves hopelessly doomed. "Mrs. Smith had a cancer, went to the hospital, had a terrible operation, and came home to die. What is the use?"

We are forced to the conclusion that the great majority of these cases would have been discovered while the door of escape was yet somewhat open, had they known the truth that cancer is, at the first, a local, or possibly a regional disease which, if discovered early and

thoroughly removed in conjunction with thorough radiation, a complete cure can be confidently expected. When the public is fully educated to the truth, that it is the delay that kills, that procrastination is not only the thief of time, but of life, and when the family physician fully awakens to the fact that it is fatal to delay, that precancerous symptoms should engage his attention like appendicitis or an acute infectious disease, then, and never till then, shall we prevail against our common enemy.

In the cancer zone especial attention should be directed to improved ways of living, as, for instance, less food, more sleep, and more living in the open rather than in the densely populated centres. The physician and patient alike must watch for symptoms of all forms of chronic irritation, and when found seek their removal. All growths, of whatever description, should receive attention. A few unnecessary operations will be, by far, overbalanced by the great common good. Chronic ulceration of the cervix or eczema of the nipple should receive proper care. A continued loss of weight calls loudly for thorough search. Repeated attacks of indigestion should be investigated by the roentgen ray. Carmen reports the case of a cancer of the stomach discovered while the size of a cherry. If an error is to be made let it be made on the safer side. It is of little consequence mistakenly to regard a harmless symptom as a possible malignant signal, but it may do the patient irreparable damage mistakenly to regard a precancerous symptom as unimportant.

Always beware of blood. Blood is not only the most flaring symptom but it is the most significant. Any bloody discharge from the mouth, urinary bladder, uterus, or rectum, may be of mighty and timely purport. If blood follows a douche, coitus, or an examination, question the cervix. If the flow is excessive, even before the cancer zone is reached, the cause should be sought and removed. If the patient displays a watery, slightly blood-tinged discharge, if she flows too freely in the cancer zone, if she flows inter-menstrually, if she starts to flow after the climacteric has been well established, malignancy should receive first consideration.

It is an unfortunate fact that there exists a belief, very prevalent among patients and to a very limited extent among physicians, that ex-

cessive flowing, in the danger zone, is one of the indications of the approach of the climacteric. We can excuse the misguided patient, unfamiliar with medical facts, for harboring such a delusion, but the physician should not allow himself to controvert the accepted meaning of a well defined medical term. This is never a manifestation of the coming of the so-called change of life, but should rather be considered as Nature's warning of the approach of danger.

"Beware of blood" should be framed as a motto and not only adorn the physician's office wall, but should be conspicuously hung in every home. Blood to the physician should be the red flag telling of impending danger, as the bell buoy telling of the unseen but perilous reef; as a beacon light which will not be dim while death shadows obscure the fate; that he, of all men, the mariner of life itself, may not forget or forfeit his great trust.

The mighty efforts of pathology, therapeutics, and surgery, have been in vain to stay the annual piratage of "this captain of the men of death." The ultimate mortality of those once afflicted with cancer is estimated at ninety per cent. Under the existing conditions the surgeon admits that he has reached the limit of his possibilities. All forms of medication, one after another, "have had their little day and cease to be."

Is there no solution of this, as yet, hopeless problem? Is it not possible from the knowledge which has been already acquired and the agencies we have at hand, to place this dread monster, like tuberculosis and syphilis, in reasonable captivity, that it may no longer roam at large, seeking as easy prey those it may devour?

The most promising possibility seems to lie along the line of a combination of all our knowledge and agencies. The family physician, the patient, and the radio-therapist must come to the surgeon's relief and aid. In other words, I believe our only wise dependence is in skilled surgery reinforced by a public educated to the truth of the cancer evil, by the family physician made fully aware of the danger of diagnostic error and delay, and by the radio-therapist equipped and skilled in the use of the weapons which modern medical discoveries have placed in his hands. These discoveries combine and include two distinct agencies, both of which exert a powerful influence on the tissues of the body, namely roentgen rays and

radium. When properly applied and in sufficiently massive doses these radiations exert a distinctive effect; first, upon the nucleus of the lawless cell, more especially and more powerfully when this cell is youthful and undergoing division, of inhibiting its power of proliferating. Later it becomes irregular in outline, granular in substance and finally disappears. At the same time the body of the evil cell presents stages of softening or liquefaction followed by necrosis and atrophy and finally follows the fate or its nucleus and disappears. This destructive process is made possible because the cancer mass is a low grade embryonic tissue much more easily destroyed than the more resistant normal structures. Simultaneous with this destructive process there is a definite stimulation of connective tissue proliferation, and by a due process of repair Nature replaces the cancer mass with fibrous tissue. The great advantage of this form of treatment is the possibility of destroying the malignant without injuring the normal cells. These results presuppose that the cancer cells are so located that they are within easy reach of the extreme dosage of radiation. Unfortunately, this is not always possible.

When the lymphatics, the paths along which the evil cell migrates or spreads, become malignant, it is next to impossible for the most skilled and extensive surgical operation to remove them all; but by radiation we have a means for their destruction; and if the unaffected lymphatics lying further out be subjected to a full inhibitive dose of radiation, a similar fibrous repair takes place and the glands become sclerosed, so that instead of presenting easy channels for invasion, mountain fastnesses now bar the way and say, "Thou shalt not pass."

I believe a mistake has been made in not combining, in a routine way, both these radiant energies and thereby doubling their efficiency. Radium possesses the advantage of actual contact to the tumor mass and is most adapted to the cavities of the body, as the mouth, oesophagus, or uterus. The roentgen rays easily cover large superficial areas and become an admirable agent in scouting metastases. "Radium applied locally, supplemented by roentgen rays to the adjacent tissues, gives the ideal form of radiation. A combination of both, carried out scientifically, seems the practical method and should cure more advanced

cases than either alone." Radium in this combination enables one to cross fire from within as well as from without. The failure to combine these equally useful and effective agencies at home accounts for the better reports which come from abroad, where one form of radiation is never used alone.

Some surgeons, in various parts of the world, are beginning to make use of radiation both before and after operation, to reduce the malignancy and to seal up the lines of metastasis, believing that this method gives the greatest promise of ultimate recovery and permanent cure. In substantiation of this I quote the opinion of a group of men who had the longest and largest experience in profound radiation. I refer to the clinic at Freiburg where the noted surgeon, Gauss, speaks in strong terms of their results with radiation. A renowned surgeon once said in his clinic, "When you find a cancer of the cervix, run away." We no longer run from cancer, even in its most hideous manifestations, for in these extreme inoperable cases, abandoned and without hope, shunned and avoided like lepers, radio-therapy has achieved most brilliant results. It has demonstrated in these pitiable sufferers, to the entire satisfaction of all observers, that it has a tremendous potency in reducing malignancy. When one of these pained, foul, bleeding, human derelicts is profoundly radiated, a transformation akin to miracle takes place. The pain at once ceases, and the habitual morphine can be removed. The hemorrhage stops. In this instance, radium seems to be a specific. "The endothelial cells of the intima degenerate rapidly, the lumina of the vessels retract, resulting in a speedy obliteration, and consequently the tumor cells cannot obtain the nourishment needed for their maintenance of life and for their proliferation." As a result, the ulcerations dry up and quickly heal over. The foul, offensive, penetrating, never-to-be-forgotten odor disappears. The general health and strength remarkably improve, for deep radiation seems not only to be able definitely to check or destroy toxic and debilitating absorption but it also unquestionably stimulates general metabolism. But more than this, the fact that these spectacular remedies are being applied, together with the quickly appreciable results, brings back, though long deferred, Nature's natural stimulants, courage, comfort, and hope, to replace despair and the contemplation,

amidst stench and pain, of the dark valley and the shadow of death. If this were the only hope and accomplishment of radiation would it not be eminently worth while? What more exalted remedy has ever been devised than that which is capable of giving these, the most abject sufferers, the most cursed victims of our race, a new lease of comfortable life, varying from one to five years, and very rarely ultimate relief? Many who have come to chaff at the radio-therapist, when he has undertaken to treat these hideous cases, have remained to pray.

Finally, as a befitting summary of this discussion, I will outline, in brief detail, a working scheme for coöperative hope.

First. The patient taught to recognize precancerous symptoms and that prompt action means life and that delay may mean death.

Second. The family physician, inspired by modern teachings to become as keen as a detective, as unbiased as a judge, and as prompt as a general, to suspect, diagnose, and act.

Third. The surgeon decides the case is operable. As an example, let it be cancer of the breast. He wisely hesitates, fearing he may precipitate rather than delay the evil end, for he knows from frequent and sad experience, that often the cutting into a malignant mass breaks down Nature's protecting wall and a local is converted into a general disease, or, in other words, he knows that an "incomplete surgical removal neither prolongs life, retards the progress, nor affords palliation, but rather hastens the progress." Therefore, he seeks radiation to render the cancer cell less malignant. This is not so necessary in the tumor mass itself as it is in the lymphatics around about which have become malignant, for their complete removal is attended with great difficulty. It is equally vital to radiate in a thorough manner the innocent lymphatics further out beyond the malignant advance to bar the way to the evil cell which may be let loose by the operation. Therefore, before operating, he sees to it that not only the cancer mass is deeply and profoundly radiated, but the outskirts, so as to kill the metastatic processes and close all the lymph channels leading outward which are as yet unaffected. The axillary, the supra-clavicular, the inner-mammary, the epigastric, and the mediastinal spaces are all, in turn, given the most massive roentgen dosage our transformers can afford. The surgeon then operates as

thoroughly as skilled experience dictates. In some instances tubes of radium have been sewed into the wound for a period of full dosage. As soon as the time limit for another radiation has expired the entire wound is again radiated and, as before the operation, now again the outlying lymphatics are to receive another dose. The patient is monthly inspected and at the slightest provocation is again thoroughly radiated, and so on till all signs of malignancy have entirely disappeared. This thorough method of radiative treatment has been in practice for so brief a period that the results cannot, as yet, be tabulated, but so far as my limited experience goes, and as far as I have been able to learn from others, these adequately radiated cases have less frequently suffered a return of malignancy.

Fourth. The surgeon decides that the case is inoperable. The sufferer's only hope now rests in radiation. The radio-therapist is now the last resort. He must fight the well-nigh victorious foe single-handed and alone. But, thanks to that immortal quartette of radiation fame, Crookes, Roentgen, Curie, and Coolidge, we find in his hands an armamentarium of unexpected value. For has he not at his command the radium howitzer belching forth its fiery projectiles for almost countless centuries capable of perceptibly piercing twelve inches of solid iron? For has he not at his command the roentgen machine gun—the Coolidge tube, capable of continuously sending hard and destructive rays into the deep recesses of malignancy?

We have seen only the beginning, but we fervently believe that, with accumulated experience, improved methods, and a better conservation of radiant energy, accompanied by the faithful and untiring American inventive art, the day will come when the radio accomplishments of today, wonderful as they are, will fade like an idle dream, because of their comparative insignificance.

Then let us hopefully unite, the patient enlightened as to the more healthful ways of living and forewarned by a knowledge of the early symptoms of malignant disease, the physician quick to discern and apprehend the danger, the surgeon skilled in his art, wisely choosing as his handmaid those radiant potential energies that the work of his hand may have greater permanency and blessed cure.

ROTATION DEFORMITIES.

By CHARLES LE ROY LOWMAN, M.D., LOS ANGELES, CALIF.

In my study of the effects of leg rotation on the foot I have followed out the idea of correcting weak, pronated, and flat feet by attention to two chief factors: (1) control of the whole leg lever, and (2) correction of the torsion deformity of the foot. I have found that certain cases, although quite flexible, could not be made to use their feet in proper relation to the legs. When the knees were flexed in the normal plane (see Fig. 1) their feet would be averted



FIG. 1.—Knee slightly flexed forward touching the plumb line.

and toe out. When these feet were held in varus by using Thomas heels, muscle strain would be relieved but the anteroposterior axis of the feet would not coincide with the axis of knee action and a certain amount of uncorrectable out-toeing remained. If, by determined effort on the part of the patient, the feet would be used in the straight position, it then became apparent that the inward rotation of the thigh was still present, the knee action being in a plane inside the anteroposterior axis of the foot and the inward rotation in the hip joint being in direct relation to the foot position (see Fig. 2).



FIG. 2.—Foot used straight. Knee thrust directed inward.

This condition of torsion in the long axis of the leg is one which we have been studying since 1908. Our efforts to control the high rotation have been first to correct or lessen the degree of rotation by raising the inner border of the foot and throwing the heel in varus, and second by taking the twist out of the forefoot. This necessitates follow-up work and is accomplished in flexible feet by adducting the forefoot or checking its abduction. This is done by lowering the arch brace under the cuneiform and the first metatarsal, which allows the lacing of the shoe to exert a downward and backward thrust while the fulcrum under the scaphoid and front of the os calcis controls the tendency to lower and pronate at those points. This reverse twist is aided by thickening the sole of the shoe under the fifth metatarsal shaft and head. It is a common practice by many orthopedic surgeons to thicken both heel and sole on the inner border. This throws the whole foot into varus and tends to prevent the correction of torsion in the forefoot. After tension on the rotatory apparatus is lessened, we attempt to strengthen all muscles and ligaments that prevent inward rotation, and to tone up all the muscular groups that connect the legs to the body, principally the piriformis, gemellus, obturator, and gluteal groups. This is just as important as to give corrective exercise to the intrinsic foot muscles. We feel that the control of symptoms and the return to tone and

strength of the muscles, in most foot strain cases, is brought about by the use of the legs and feet in corrected positions. The reestablishment of ligamentous and muscular balance thus brought about takes place in the femoropelvic structures. This is true not only in the rotatory mechanism but also in the local foot structures, and in cases of pronation with inward rotation.

Many cases have deviations not correctable to the normal plane of action, and I had felt that some radical procedure was necessary in these cases. In 1915 I visited Atlanta and found Dr. Hoke working on this phase of the problem, *i.e.*, the correction of skeletal alignment by osteotomies with replacement of the joints in proper relation one to the other. He was giving special attention to rotation deformities, *i.e.*, torsion in the long axes of bones. Here, then, was the explanation for the condition noted above as applied to the ordinary static cases of pronated feet with rotation of the tibia and resulting eversion. Dr. Hoke had applied this especially in infantile paralysis and club foot cases. In observing these cases I at once saw the reason why certain cases could not be controlled by braces but had developed foot and leg deformities in the best braces our skill could devise. Subsequent investigation and observations in some of our very best orthopedic hospitals and clinics demonstrated that the same conditions existed there. Many operated foot cases were relapsing because the rotation deformity had received no consideration.

The very best skill in transplanting tendons, doing astragalectomies, transverse sections, and such well known procedures, may be largely wasted if there has been no appreciation of the fact that the motion at hip or knee is not properly directed over the foot. During the three years that have passed since this enlightening visit to Dr. Hoke, I have done osteotomies to correct torsion deformities in the legs and feet with extremely satisfactory results. These have been done chiefly in paralytics, but the application of this method in cases of non-paralytic faulty foot and leg statics is what I desire to point out.

A careful study of postural defects in growing school children or in the adult foot cases will show that a high per cent. have the gravity line of the leg deviated inward. The thighs will be rotated inward, knees pointing inward.

calves outward, and ankles in valgus, feet pronated, and mostly in the out-toe position. From behind, the line dropped from the mid-popliteal point will not pass into the middle of the os calcis or in line with the tendo Achillis.

When standing, if the patient is requested to twist the thighs outward, the inner border of the feet will rise and in most cases, the mid line through the patella will then pass through the ankle to the interspace between the first and second metatarsal where it normally should be. Others, however, will not be able to bring the anteroposterior axis of the knee to coincide with the long axis of the foot. The foot straightens before the knee comes to its proper place and if the motion is increased to bring the knee in proper position, the foot is carried over into varus. (See Fig. 3.)



FIG. 3.—Owing to shadow under inner margin, the beginning varus of the heel does not show as plainly as we wished.

This is especially true in certain leg cases where there is a little more than the normal bowing of the tibia, to which is added a torsion deviation in its long axis. Another test will also unmask this condition. With patient seated, leg extended, knee exactly in the sagittal plane, bring the anteroposterior axis of the foot as well as possible into the same plane and ask patient to dorsiflex the ankle. He will be unable to flex the usual amount. Now let the foot relax to the toe-out position, and unless there is contracture of the tendo Achillis,

there is no difficulty in dorsiflexing ten or twenty degrees more than a right angle. Repeat the same motions passively and you will feel in the first instance a mechanical resistance and in the other, no resistance, but the rubbery stretch of the Achilles. Now note the axis of free motion of the ankle joint and compare with that of the knee. You will note from fifteen to forty degrees of outward rotation of the tibia, which is often unilateral and frequently differs in amount on the two sides. I have noticed it to be more common or to a greater degree in the right leg. The reason for this difference in motion at the ankle joint is that when the foot is forced into the sagittal plane the astragalus is held outward by the grip of the malleoli, and its passage backward during dorsiflexion is interfered with. The line of thrust should pass through the anteroposterior axis of the astragalus and if it does not, there will be a twisting thrust against the outer malleolus similar to the twist of a key wrench in a socket or slot.

This condition is far more common than one would think unless he begins to look for it. As I have never seen or heard of an explanation for its incidence I wish to offer some observations in regard to it. In ordinary static cases, beginning in babyhood before the arches have formed, the weight in many cases is borne too far inward. This is because of a slight degree of knock-knee, or an exaggeration of the normal tibial bowing which forces the thrust from weight-bearing inward.

When beginning to walk, babies use a very wide base with feet far apart and take short, rather stiff-legged steps. Practically all baby shoes are very wobbly. They are round soled and have the uppers improperly placed, with short back and high front seams, which induce the back-knee position. In crawling they frequently toe out and push with the inner border of the foot. It is not at all uncommon to see children from two to five years of age sitting on the floor or ground with the knees acutely flexed and heels opposite the trochanters. This position, by the way, is very common in palsytics, especially in double leg cases. The thighs (see Fig. 4) are forced strongly into inward rotation, the knees rest on the floor on the inner condyles, the inner malleolus is on the floor, and the foot is held strongly everted and pronated.

In using the pushmobile and kiddy cars, in



FIG. 4.

roller skating, drilling, gymnasium work, and dancing, the toe-out position is assumed.

Many parents being afraid that the early straight-foot position will lead to pigeon toes, continually urge the child to toe out. About puberty, girls put on narrow heeled misses' shoes, the inward inclination of the femur increases, and any potential weaknesses of the foot and knee structures are increased.

All of these conditions develop, or predispose to the development of the out-toe position. As the leg thrust in walking must be in the anteroposterior plane, we may consider that the resistance of the ground to this thrust is an active force, bearing against the inner border of the foot in the toe-out position. This force being transmitted through the foot to the astragalus in an outward direction acts like a key wrench in twisting the mortise of the ankle joint outward. This continuous twisting thrust against the short arm of the right angle made by the foot and leg, produces a torsion deformity in the tibia or stretches the knee joint ligaments and decreases their stability. As this condition increases it becomes impossible for the hip, knee, and ankle joints to work in their proper places; for instance, if the feet are placed or used in a parallel position the knee joints thrust inward and the heads of the femora rotate inward. Ultimately, this produces symptoms of joint strain manifested in adults by changes in the joint linings, *i.e.*, hypertrophy of the fringes, spur formation, and other osteoperiosteal changes.

These rotation deformities are seen in their more exaggerated forms in paralysis, club foot, or congenital hip cases; both produce outward

rotation of the tibia. I have already mentioned the common sitting positions which infantile paralysis cases assume. One rarely sees children with paralysis of several years standing without brace correction, in whom one or more of these rotary deformities does not occur. The outward rotators and abductors of the thigh are not affected as frequently as the other groups of muscles. They exert their force in holding the thigh outward and the trochanter backward. In walking, the weight of the body thrusts the knees forward and inward, and this combination produces torsion in the femur. The type of foot so commonly found in paralysis is one of toe drop and valgus. In walking the leg is swung forward to overcome the toe drop and is brought down in the toe-out position, which causes the rotation of the tibia as explained above. In varus feet, both the congenital and paralytic types, the forward thrust of the knee over the adducted forefoot increases the buckling outward in the mid-tarsal region. The backward thrust through the first and second metatarsals, cuneiform, and scaphoid, pushes the head of the astragalus backward with the resulting torsion of the tibia in the long axis.

In congenital hip cases, due to the dislocation upward and backward, the outward rotators and abductors become shortened, and the angle of the neck of the long axis of the shaft is changed, as pointed out by Dr. Russell Hibbs. Unless this torsion deformity is appreciated, many failures in their reduction result. This condition is undoubtedly exaggerated as the result of improper alignment in those cases which have walked, although Dr. Hibbs has asserted that he has noted torsions in cases before the walking stage.

This condition has probably been overlooked for so long because it does not appear as a deformity, whereas, a few degrees of knock-knee or bowleg is very apparent even to the layman. An appreciation of this condition in the routine examination of all leg cases and its correction when found, will result in increased success in restoring function and in corresponding satisfaction to the surgeon.

GIFT OF \$10,000 TO PETER BENT BRIGHAM HOSPITAL.—The will of Alexander Cochrane leaves \$10,000 for the establishment of a free bed at the Peter Bent Brigham Hospital.

NOTE ON THE ARTICULAR SEPARATION OF THE MIDDLE AND INTERNAL CUNEIFORMS WITH AND WITHOUT FRACTURE.

BY FREDERICK W. O'BRIEN, M.D., BOSTON.

THE following note has been suggested by a series of foot injuries seen at the Cambridge Hospital, Mount Auburn Street, during the war period, many of which were referred from the Watertown Arsenal. In all cases there was a question of fracture of one or other of the tarsal bones. Clinically, these cases presented the usual signs seen following a crushing blow.

In one case only out of some fourteen examined did we diagnose definitely a fracture of one of the cuneiforms, but in all of them was seen what we have characterized as an air space due to articular separation of the middle and internal cuneiform bones, well seen in type A, figure 1.

All cases did not present such a definite air space, but where the clinical signs with localized tenderness were pronounced and we obtained a roentgen plate such as is seen in figure 2 and called by us type B, we have not hesitated to report articular separation of the cuneiforms. That this type may not be real we are willing to concede, but have adopted it



FIG. 2.—Type B.

for a working diagnosis until further observations made either by ourselves or others may confirm or refute it.

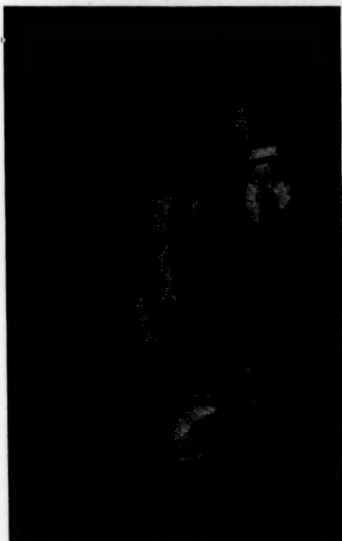


FIG. 1.—Type A.



FIG. 3.—Type C. Fracture line limned for reproduction.

Type C, figure 3, where a definite fracture of one of the cuneiforms appears stands by itself. The point of this note is not to claim any originality but to offer these observations in the hope that they may help from a roentgen and clinical point of view to clear up some obscure and traumatic foot cases.

A study of the ligamentous and muscular attachments of the tarsus and foot mechanics suggests the thought that we have the articular separation of the cuneiforms more frequently than fracture of either of these bones because of the relatively weak interosseous ligaments, and because of the position of these bones in their relation to the arch.

The dorsal and plantar ligaments which connect the scaphoid with the cuneiform bones do not seem to be concerned. The so-called intercuneiform ligaments plantar and dorsal are directly involved.

The dorsal ligament consists of two bands of fibrous tissue which pass transversely and connect the middle with the external cuneiform. The plantar ligament has a similar arrangement as that on the dorsum. They are also strengthened by processes given off from the tendon of the tibialis posticus.

The interosseous ligament also plays a part and consists of strong transverse fibres which pass between the rough non-articular portions of the lateral surfaces of the cuneiforms.

Since the movements of the cuneiform bones are limited to a slight gliding upon each other, it seems fair to conclude that with such a definite air space as seen at least in type A, figure 1, we are dealing with a pathological reality.

Clinical Department.

HERNIA OF THE SMALL BOWEL INTO THE RECTUM.

By A. T. DOWNING, M.D., LITTLETON, N. H.

THIS case is reported because it is believed to be a rather rare condition. Details will be given just as the problems presented themselves as the case progressed. The patient was a boy eleven years old, referred by Dr. Boynton of Lisbon. Family and previous history were both negative.

The present sickness began with sudden severe pain in the abdomen, accompanied by vomiting and prostration. The boy's mother, having had the experience of a large family of children, and supposing this an ordinary indigestion, did not call a doctor for several days. The second day the vomiting persisted and a diarrhea began, which soon became involuntary. This continued for about four days, when he was seen by Dr. Boynton and a diagnosis of probable peritonitis made.

Examination at the hospital five days after the onset of sickness showed three distinct features in the case: a marked general peritonitis, a severe acidosis toxemia, and an involuntary diarrhea with wide open sphincters.

The abdomen was extremely distended and very rigid, with dullness in both flanks, and very tender all over. Pulse was very rapid and weak and temperature was 97. Leucocyte count was 14,000. The urine contained no albumin, but was loaded with acetone. Lips and tongue red and parched, throat red, skin clammy, together with a dull and listless mentality, made a rather typical picture of a severe acidosis toxemia. The involuntary diarrhea with relaxed sphincters and acetone in stools was laid to the acidosis and no rectal examination was made. The boy was evidently very sick.

Having previously had an unpleasant experience with septic peritonitis complicated by acidosis, we hesitated about operating on this boy. However, the next day a leucocyte count of 16,000 decided for operation. Ruptured appendix seemed to be the best guess for the cause of the peritonitis, so a right rectus incision was made. The peritoneal cavity was distended with thin pus containing masses of fibrin and free fecal matter. The lower two-thirds of the abdomen was blocked by a tangled mat of adhesions, impossible to separate. In the pelvis the adhesions were so dense and the tissues so friable that even a reasonable examination was out of the question. The appendix was tied down to the brim of the pelvis, and had the appearance of an acute gangrenous inflammation, without any macroscopic perforation. There was no perforation in the cecum.

Conditions in this region could not account for the fecal matter in the abdominal pus. Adhesions were separated as much as possible, but

no break in the bowel was found. A left rectus incision was then made and drainage established on both sides of the abdomen. A pint of sterile solution of soda bicarbonate was given by hypodermoclysis during this operation.

Recovery from the operation was stormy, with much vomiting. There was a very free discharge of pus from both incisions and fecal matter from the right incision. The involuntary diarrhea and the relaxed sphincters continued. The acidosis cleared up satisfactorily. On the whole, he made good progress, with comparative freedom from abdominal pain for about fifteen days.

At this time there was loss of appetite, chills, and fever, with colicky pains in the abdomen. There was pain, tenderness, rigidity, and swelling just above the symphysis. A pus pocket was evident and incision was made over the mass. A collection of pus and serum was evacuated and drainage put in.

Up to this time the involuntary diarrhea and relaxed sphincters had been present all of the time. Rectal examination had been impossible, without an anesthetic, so this opportunity was taken to investigate conditions there. Well inside the internal sphincter muscle was found the lower end of a tumor about the size of a goose egg. This mass was hanging from the anterior rectal wall, and was high enough so that the point of emergence could be reached with difficulty. The surface of this mass was firm and pebbled, like the surface of an orange, and bled easily. There was nothing distinctive about the feeling, except that it was a little softer in the center, but it gave no suggestion of fluid contents or gas. There was considerable constriction about the base of the mass, giving almost the suggestion of a pedicle. We were unable to determine the nature of the growth, and the boy's condition precluded any further work at that time.

For a couple of days this operation seemed to give relief, but vomiting soon began again, and became distinctly fecal in character, with severe abdominal pain and distention. The boy's condition was extreme, with plenty of evidence of a pretty complete obstruction, and an enterostomy was decided on. A high median incision was made, over the only area where there was even a comparative freedom from adhesions. The freest loop of bowel was brought up and sutured to all layers, including the skin, and then opened on the top of the loop, leaving

the under side intact, thinking that perhaps some material might pass by if the obstruction should be relieved.

At this time another attempt was made to relieve some of the adhesions in the pelvis. This attempt was evidently successful, partially at least, for from this time on we had quite free movements, both by rectum and by the enterostomy opening. The vomiting and abdominal pain were promptly stopped and the boy's general condition improved greatly. He was able to take nourishment fairly well, and in a few days seemed beyond a dangerous condition.

We were still confronted by the tumor in the rectum, with relaxed sphincter and the involuntary diarrhea. After a period of ten days we decided to tackle the rectal tumor. This was again examined under ether and found, as before, with the lower end well up beyond the internal sphincter, and the body of the tumor very near filling the whole rectum. The whole mass seemed a little larger than at the previous examination. The fixation to the wall of the rectum was firm and only the extreme lower end could be brought into view. A heavy curved clamp was passed up next to the rectal wall over the narrowest part of the tumor. By this means the base was clamped and cut off. On removal, the tumor was found to be a loop of small bowel, very tightly constricted on the ends of the loop, where it passed through the rectal wall. The bowel wall was much thickened and was covered by a heavy coating of granulation tissue. The loop of bowel was not patulous, and was absolutely empty. The bowel was also sharply kinked in the center of the loop, making it seem impossible that any bowel contents ever passed through this loop after it became fixed in the anterior rectal wall. The clamp was left in position and removed after two days. After this the sphincter muscles regained their tone, and the boy regained control of his movements, which still continued both by rectum and by enterostomy.

The boy's general condition improved and he was able to eat and digest a rather generous diet. Conditions about the enterostomy precluded any further surgery for some time and he was left, hoping that he would gain some much needed flesh, while the tissues in the abdominal wall were cleaning up. The enterostomy loop must have been pretty high up on the small bowel, for the discharges contained much bright yellow bile and were very irri-

tating. He gained in strength, and was able to be taken out of doors, but did not gain much in weight.

After six weeks of waiting the abdomen was again opened and the loop of bowel freed from the abdominal wall. The enterostomy loop was resected and an anastomosis done. He vomited intermittently for several days but never persistently. He passed gas freely the first day after the operation, and there was no leakage from the anastomosis. Normal bowel movements were reestablished after a few days. There was considerable sloughing and discharge during the healing of the abdominal wound, but sound union after a time.

Just previous to the last operation, the boy added an interesting bit to the history. He told his mother that on the afternoon of the day he was taken sick he jumped from a high beam in the barn and hurt himself terribly inside, and that something came out behind, and that his small brother had to help him put it back.

The boy has made a seemingly complete recovery from his series of operations. He has been home a month and is getting about in a normal manner and having perfectly normal and regular bowel movements on a general diet. There were some problems in connection with the case that were never exactly figured out, for instance, just what happened in the abdomen to make possible copious movements, after a loop of bowel was incarcerated, and almost completely strangulated in a hernia. In the general sloughing and perforating process going on above, Nature must have provided some sort of a short circuit.

Operative procedures on this boy began in February, 1918, and proceeded over a period of three months. When he left the hospital he was able to eat and digest, with comparative ease, a pretty generous diet. He gained rapidly in weight and strength, with no serious disturbance in the movement of intestinal contents, and at the present writing, about a year after the last operation, he is apparently perfectly well, robust, and active as any boy of his age, and able to do hard work. He has no constipation, no colic, and no indigestion.

A CASE OF SUCCESSFULLY OPERATED WOUND OF THE HEART.

By E. GRANVILLE CHARTREE, M.D., BOSTON,

Major, R. A. M. C. (Harvard Unit); Surgeon in Charge of the Surgical Division of 22 General Hospital, France.

IN reporting this case I am keeping in mind the desire of Allied Army Medical Services to have available records of war injuries against the time of compiling the surgical history of the World War. At the request of Colonel Richards, consulting surgeon in the British Army for the Etaples district, I am recording this the only case of heart injury to reach our hospital; the twelfth, I am informed, in the British Army to reach operation; one of the four recoveries; and the only case of heart injury I personally have seen or operated. Private E. LeClair, a French Canadian in the Canadian Army, while in a trench watching an air battle between a French and a German machine on November 8, 1918, was struck in the chest by a spent French bullet.

The patient was admitted to 22 General Hospital on November 9. He was in good condition but complained constantly of a scraping, sharp pain in the region of his heart and had an evening temperature of 100 degrees. Pain prevented sleep. The entrance wound, which was situated two and one-half inches to the left of the sternum between the fourth and fifth ribs showed a slight purulent discharge. Chest examination by Major Foster Kennedy showed "pericardial friction rub best heard directly over wound and over right border of pericardial dullness. There is also pleuritic friction localized to a small area below and inside the apex beat. There is no evidence of pericardial fluid."

Chest examination by Captain Wayne S. Ramsey made next day showed: "No increase in cardiac dullness. Impulse palpable in fifth space nipple line. Action regular, rapid, sounds of good quality. Pericardial friction audible over whole of cardiac area. No evidence of fluid. Chest clear."

X-Ray Examination: "Screening shows a rifle bullet lying somewhat obliquely in the heart shadow at a depth of 8 cm. below the skin of the chest. The bullet moves with the heart's pulsation. Plates show a moving shadow in the region of the left auricle. Pericardial shadow considerably enlarged. Chests clear."

In view of extreme pain, together with an infected pericardium, a drainage operation with removal of the foreign body, if possible, was determined upon.

Operation, November 13. Septic entrance wound excised and cleaned with 70% alcohol. Eight-inch curved incision to the left of and along the border of the sternum curving outwards along the sixth rib. Fourth and fifth costal cartilages and one-inch of each of the corresponding ribs resected. Muscle flap turned outward. One-half inch of left margin of sternum removed. The plural fold, which was found to have been traversed by the bullet about one inch from its margin, reflected carefully to avoid breaking up its recently closed bullet holes. Pericardium opened by a T-shaped incision to give access to extreme left side of the heart. Considerable thin pus escaped. An area of fibrin and adhesions found between the visceral and parietal pericardium on the extreme left surface of the heart near the junction of the left auricle and ventricle. On stripping the adhesion it was found to cover the entrance wound into the heart muscle. Stay sutures were placed in the ventricle. By this means the heart could be rotated towards the mid line. The bullet, which was found to lie tangent to the cavity of the heart but completely buried in the muscle, did not penetrate the cavity. Owing to sepsis the wound in the heart was not sutured after the bullet had been removed.

Incision in pericardium loosely sutured about rubber tissue drain to lower end of the incision. Muscle and skin flap sutured into place.

No evidence of pleural damage noted at time of operation. Recovery uneventful, save for collapsed left lung.

Patient was seen at Liverpool, January 21, 1919. He was walking about. He stated that he felt entirely well. A letter dated March 13, 1919, from his hospital, states that he has been discharged to Canada apparently perfectly well.

Book Reviews.

Diseases of the Nervous System. By SMITH ELY JELLIFFE M.D., Ph.D., and WILLIAM A. WHITE, M.D., Philadelphia and New York: Lea and Febiger, 1917.

This most excellent textbook, one of the very few in which diseases of the nervous system and the mental diseases are both really adequately treated, shows it has met with the reception from the medical profession which it deserves from the appearance of this second edition within two years after its first publication.

In this edition none of the excellencies of the first edition have been lost, and on the other hand, the chapter on the endocrinopathies has been entirely rewritten, and has resulted in one of the best summaries of our present knowledge of this most interesting and obscure class of diseases which has come to our attention. The authors have also added a great deal of matter in various parts of the book, giving some of the practical additions to our knowledge from the results of the many injuries of the nervous system, seen in the present war, and something of the methods of treatment evolved to meet their results. The large field of so-called shell-shock neuroses in future editions will need much enlargement even in a general textbook such as this.

Diagnostic Symptoms in Nervous Diseases. By EDWARD L. HUNT, M.D. 2nd Edition, Philadelphia and London: W. B. Saunders Co. 1917.

This little book, which has had a most favorable reception from the medical profession, gives briefly the essentials in its description of the various details of examination of the nervous system, and the significance of the results, and is especially well adapted for the use of teachers and students, or practitioners who do not see many cases of nervous disease.

This second edition has been much improved by the addition of an excellent chapter on vertigo, another on the very important examination of the cerebro-spinal fluid, which contains all the essential methods, and the significance of the results found, and a third, which takes up the rather difficult subject of spinal localization. Practically the only criticism that can fairly be made of the book is in regard to this chapter, in that while it is for the most part full enough and clear, hardly enough description has been given of the sensory distribution, especially of the spinal metameres, the skin areas corresponding to the segments of the cord. More space might also have been given to the explanation of conjugate deviation of the eyes, and the fact that the Achilles jerk is often lost in tabes, while the knee-jerk as retained has in some way escaped mention.

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OCCUPATIONAL THERAPY.

DR. HERBERT J. HALL, of Marblehead, Massachusetts, in his article entitled "Bedside and Wheel-Chair Occupations," has summarized briefly the substance of a few of the lectures given to classes at the Boston School of Occupational Therapy. Some time ago the Surgeon-General's office sanctioned the establishment of schools for the training of reconstruction aides, —women who should be at least 25 years of age, and of suitable personality, to furnish forms of bedside occupation and to direct the handwork of disabled soldiers. The course as outlined includes weaving, simple woodwork, basketry, block printing, knitting, applied design, a certain amount of practice teaching and hospital routine, and methods of invalid teaching. It is not required that the young women shall become expert craftsmen, nor shall they be expected to prepare the men for a trade. The object of these simple occupations is to exercise the mind as well as the body. Work, of a suitable nature, is the best possible means

of restoring nerves and muscles to normal action.

Bedside and wheel-chair occupations are now a permanent factor in military hospitals and the result of this kind of therapy will be seen in the work produced by the men. Some patients will be naturally clever, others awkward. But it is not so much the quality which counts, —"the reward is in the trying,"—and it often happens that through this means a man will develop a decided understanding of color, form, etc., which will later become the nucleus of a larger crafts system and thus the teaching in his case will of a certainty be justified. The first ideas which suggest themselves to one's mind at the mention of the word "hospital" are, medical and surgical treatment; but before long a third idea will present itself also, in connection with civilian as well as military hospitals, "rehabilitation."

It has been found in every-day life, that mental attitudes react upon all functions and produce in some cases what we call fatigue. This condition is an important factor to be considered in the reconstruction hospital. The reconstruction aide, therefore, is taught that by a simple process of graded effort, regulated activity is to be encouraged. Keeping in mind this fact, the possibilities of the use of the small handicrafts are readily observed and the daily wave of strength and resistance is carefully taken into consideration with each patient. The time for bedside occupations will usually coincide with the hospital daily routine.

Unless favorable conditions for work exist, unless the patient be encouraged and made hopeful, no amount of striving will accomplish the desired result. This is especially true among patients handicapped by nervous exhaustion. The satisfactory accomplishment of some very simple task which may be assigned to him may be all that man needs as an inspiration for further effort. Everything is possible with hope and ambition for a foundation, and with those two comes a moral and physical reinstatement which is of inestimable worth. For this reason, the establishment of occupational therapy in civilian hospitals, asylums, and state institutions seems now almost inevitable after its successful employment in the military hospitals, and through this means we may expect many an inmate of a state hospital, the chronic invalid, and even the bored convalescent, to improve his mind and body.

THE ORGANISMS OF YELLOW FEVER AND INFLUENZA.

SCIENCE, in its issue of April 18, 1919, has taken from the *London Times* a note concerning the death of Major H. Graeme Gibson, R. A. M. C. Dr. Gibson, with his co-workers, Major Bowman, C.A.M.C., and Captain Conner, A.A.M.C., had just completed the discovery of what is very probably the causative organism of the influenza.

On December 14, 1918, the *British Medical Journal* published a preliminary note from these three doctors concerning the influenza germ, but at that time the discovery lacked complete evidence. Major Gibson's death, however, completes the evidence. He was a victim of the germ which he had tried so earnestly to identify, and pneumonia quickly followed this attack.

The germ belongs to the order of filter-passers. It is grown by the Noguchi method. Monkeys have been infected with it and have manifested hemorrhages in the lungs. The work of Captain Wilson, mentioned in a recent number of the *British Medical Journal*, also confirms that of Major Gibson. The fact that this important investigation has been carried on by the Army Medical Corps is a complimentary reflection on that service.

Following closely upon the success of Major Gibson's work comes the description by Professor Noguchi of a new germ in connection with yellow fever. He states that the organism which he has discovered belongs to the spirochete class. In the 17th century the disease was first discovered; and although it ravaged many European cities, it remained a mystery until 1881, when Dr. Charles Finlay of Havana declared that the infection was carried by the mosquito. Then, in the Spanish-American War, came Reed's commission of investigation and at that time Dr. Finlay's theory was substantiated, but with the sacrifice of many valuable lives. "It has proved that the mosquito *stegomyia fasciata* is the agent of infection, that the virus of the disease is present in the blood during the first days of infection, and that 'the germ is so small that it can pass through a Chamberland filter.' Infection could not be produced till after several days from the time when the mosquito had bitten the yellow fever patient, so that it was evident that the germ underwent some change in the body of

its insect host." This work enabled Dr. Gorgas to make possible the completion of the Panama Canal by ridding the zone, which up to this time had been a hotbed, of yellow fever. Professor Noguchi's declaration is an extremely interesting one, especially in view of the fact that it has been suggested that the spirochetes pass through two stages of development, one of which is extremely minute. However, whether or not this view will be confirmed, through the new discovery, has not been proved.

AMERICAN SOCIETY FOR THE CONTROL OF CANCER.

In a recent issue of *Campaign Notes*, the American Society for the Control of Cancer has published some suggestions to state and local committees for promoting public education in regard to the early recognition and treatment of this disease. The work of the Society is founded upon the following conclusions: (a) That cancer is at first a local disease, (b) that with early recognition and prompt treatment the patient's life can often be saved, and (c) that through ignorance of the facts and delay in seeking treatment thousands of lives are needlessly sacrificed, so that (d) the general mortality from malignant disease is very high and apparently increasing.

It is therefore urged that every available means be utilized for bringing before the attention of the public the fact that "in the early recognition and treatment of cancer lies the hope of cure." It is believed that the essential factors about cancer and prevention should be made known to the public, without, however, causing any unnecessary alarm. Probably the best means of reaching the public is through the special instruction of nurses, midwives, and social workers.

The Society believes that the state chairman should first of all utilize existing agencies. The State Department of Health and local boards of health should be urged to publish circulars, deliver lectures, arrange public meetings, publish newspaper articles, and provide free pathological examination of specimens in its diagnostic laboratory service. The Society relies upon medical organizations to disseminate modern knowledge of cancer among practising physicians; in this work, the American Society

for the control of Cancer is willing to coöperate by providing speakers and literature for professional meetings.

In every possible way, the American Society for the Control of Cancer is willing to coöperate with other agencies in making the campaign against cancer an effective one, and asks for the intelligent and earnest support of state officials, local committees, and the general public.

OPPORTUNITIES FOR DISABLED MEN IN THE OPTICAL GOODS INDUSTRY.

THE Harvard University Bureau of Vocational Guidance, for the purpose of making available information concerning possible openings for employment of handicapped men, has recently completed a report on the Optical Goods Industry which should prove of great interest to those whose injuries may require them to choose their occupations in a comparatively limited field. This report deals with the optical industry in general and should arouse enthusiasm among disabled men to seek employment in work of this kind.

Practically all types of handicap may be disregarded in this work except perhaps that of blindness and loss of fingers. The nature of the work, because of its cleanliness, attracts a high class of persons, the working conditions are attractive, and the work is light and variable. Monotony is a strong feature in promoting discontent among normal individuals and is therefore to be still more avoided with the disabled man. In the optical industry there is a variety of material to work with, and a variety of tasks. It is a growing industry, one which is in constant demand, so that the employment is steady. The trademark, "Made in America," has come to mean that the foreign market will be more promising than ever before for these goods and the increasing use of motoreycles and automobiles, throughout the world is a fair indication of the advantages which may be expected of the skilled worker in such a trade. The work is divided into three groups: the manufacture of lenses, the manufacture of frames, and the preparation of optical prescriptions. The inexperienced man can advance from one task to another as fast as his ability will permit. Some of the men who select this occupation will show natural adaptability for certain branches of the work,

and can make rapid progress. Defective hearing, loss of one eye, a leg, etc., will not interfere with efficient work; and the wages are so graded as to enable an intelligent, handicapped man to earn a satisfactory amount. The Federal Board for Vocational Education, The United States Employment Service, and the Vocational Training Division of Massachusetts Industrial Accident Board have in their hands reports of individual establishments engaged in the Optical Goods Industry.

THE MEDICAL LIBRARY.

IN an interesting address delivered before the Medical and Chirurgical Faculty of Maryland in April, 1918, Dr. John Ruhräh has outlined the historical development of the medical library in Maryland, and has called attention to some of the things such a library means to the profession and the public.

The earliest medical library in Maryland not owned by individuals was established in 1813 and consisted of several hundred volumes. The library of the Medical and Chirurgical Faculty was started in 1830 with an appropriation of five hundred dollars for the purchase of periodicals and standard books in medicine. Every year, two hundred or three hundred dollars was appropriated thereafter, and the library grew slowly but steadily, until in 1858, a building of its own was purchased by the faculty.

In discussing the value and meaning of a medical library, Dr. Ruhräh has quoted the saying, "To study the phenomena of disease without books is to sail an uncharted sea, while to read books without patients is not to go to sea at all." Books he designates as the charts of medicine, which are constantly corrected by each generation and gradually become more accurate. It is through the library that we keep with us the teachings of Laennec, John Hunter, and William Harvey. From the library shelves we can hear Hippocrates on malaria and mumps, or we may cross to Rome and listen to Celsus on surgery, Soranus of Ephesus on midwifery, obstetrics, or the diseases of children, or Aretaeus, the Cappadoecian, describe pneumonia, tetanus, or diphtheria. Our journey may be endless and we may choose at will the best of the great souls who have labored in ancient and modern times for the progress of medical science.

NEW YORK DENTAL CLINICS FOR SCHOOL CHILDREN.

For the last six years special dental clinics for school children have been maintained by the Bureau of Child Hygiene in New York. A summary of the work accomplished by these clinics is published in a recent Bulletin of the New York Department of Health.

During the year 1918 the dental staff comprised one supervising dentist, nine operating dentists, eight nurses, and three dental hygienists. As it has been impossible to reach all school children needing dental treatment, it has been the plan to select children from the age of school entrance up to about ten or twelve years, as during this period the child's mouth is in a most transitional stage and work done will have the greatest effect upon the future. Necessary dental work in the mouths of children who are being sent away to preventoria because of predisposition to tuberculosis, is considered a most important factor in the program of these clinics.

The work done by the dentists in the clinics consists of filling, extraction, and operative treatment, together with such lectures and instructions as are necessary. The basic idea back of this dental work has been to carry home to the child the knowledge of what a clean, healthy mouth is, and the aid it is towards a healthy body. Children are instructed in the proper methods of keeping their mouths in good condition. At the end of certain periods, varying from six months to a year, all children treated are required to return for examination, in order to learn the result of previous instruction. It has been found that over eighty per cent. of these children need very little new attention. During 1918, a total number of 18,306 visits were made to the clinics.

THE USE OF YEAST IN INFECTIOUS DISEASES.

In the middle of the nineteenth century, it was believed that yeast could be used with successful results in the cure of furunculosis, anthrax, and diabetes, and in the treatment of diseases of the skin, suppurative processes, diseases of the respiratory passages, and gastro-intestinal diseases. In the latter

part of the nineteenth century, however, there came a reaction, and yeast was used comparatively little by the medical profession. In 1899, the therapeutic importance of yeast was again brought to the attention of physicians by the researches of Brocq.

At the present time, yeast as a therapeutic agent is again a prominent topic of interest. It is claimed by some that it can be used most successfully in treating gastro-intestinal disturbances, such skin diseases as acne, furunculosis, impetigo, and carbuncle, and in surgical conditions due to pyogenic organisms. Others have reported favorably on the use of yeast against infectious diseases. Yeast is being applied to many fields of therapeutic endeavor with apparent success, which can be confirmed only by the results which time can make certain.

MEDICAL NOTES.

LETHARGIC ENCEPHALITIS.—Lethargic encephalitis had manifested itself in many of our states since late winter. The United States Public Health Report for April 4, 1919, shows that during the month of March cases occurred throughout the country in small numbers. Such an outbreak in the United States is very naturally to be expected after the prevalence of this disease in Europe, but there is no definite means of knowing whether these cases are identical with the European cases. Because we are still in the dark concerning the exact nature of the condition, it has been deemed wise to make the disease a reportable one, and in the United States, California has taken the lead in requiring physicians to report their cases. In England the reporting of lethargic encephalitis has been made obligatory. Many are of the opinion that the stupor is a sequel to influenza and the widespread occurrence of influenza last winter would account for this idea. Therefore, for purposes of acquiring more definite information, it has been suggested that the disease be made reportable.

THIRD WAVE OF INFLUENZA IN ENGLAND.—It is reported in the United States Public Health Bulletin for April 4, 1919, that England has been visited by a third wave of influenza. This third wave has been very severe and is of much concern to the health authorities of that coun-

try. The number of deaths from influenza in England and Wales during December, 1918, and January and February, 1919, was very large. For the week ending March 1, 1919, 3,889 deaths were reported from 96 large cities. It is interesting to note that since the first week of September, 1918, the United States has also been visited by three distinct waves of influenza. For the week ending March 1, 1919, in this country, 2,382 deaths were reported from 35 large cities whose aggregate population was 20,000,000 in 1918.

AWARD OF CROIX DE GUERRE TO DR. A. F. THOMAS.—First Lieutenant Abraham Fifield Thomas, M.C., Ambulance Company, No. 1, Second Division, was awarded the Croix de Guerre on January 27, 1919, by the French Government, for distinguished service and gallantry in action during the battle of Blanc Mount, Champagne Sector, October 1 to 10, 1918. Dr. Thomas was born in Cambridge in 1888. He graduated from the Chicago College of Medicine and Surgery, served one year as interne in Cook County Hospital, practised medicine in Titusville, Florida, for three years, and served as railroad surgeon of the Florida East Railway and examining surgeon of the United States Pension Bureau. He made his home in Newburyport, Massachusetts, in 1916. Dr. Thomas is a member of the Brevard County and Florida State Medical Association, the Southern Medical Association, and is a fellow of the American Medical Association.

This award is not only an honor to the recipient, but reflects also upon the service rendered by the medical profession in the war.

GRATITUDE OF KING OF GREECE TO THE RED CROSS.—King Alexander of Greece has expressed his thanks to the American Red Cross for the work being done for the people of Greece. He recently visited the artificial limb factory which has been established by the Red Cross in Athens; the limbs are made entirely of American materials, and are designed and fitted by American specialists. King Alexander is reported to have praised particularly the work done by American doctors, nurses, and field workers in Macedonia and for their devoted efforts in checking the epidemic of typhus in Macedonia and the Greek islands. The agricultural survey of Greece being made by

the American Red Cross is of especial interest to the king, who hopes that American methods may be of value in increasing the productivity of the soil.

MEMORIAL LABORATORY AND CLINIC.—The Memorial Laboratory and Clinic for the study and treatment of nephritis, gout, and diabetes, was dedicated recently at the annual meeting of the California State Medical Society. The work of this institution was originally begun on Blackwell's Island, New York, to encourage research in chronic diseases; but it has been transferred by the Carnegie Foundation to the Cottage Hospital, Santa Barbara, California, under the directorship of Dr. Nathaniel Bowditch Potter. The new building, which will be devoted to the work of the Memorial Laboratory and Clinic will be ready for occupancy within a fortnight. The institution includes a hydrotherapeutic department, a cardiac room, equipped with the latest type of electrocardiograph, a complete modern diet kitchen, chemical, bio-chemical, bacteriological, and clinical pathological laboratories, and fourteen beds. Some of the ward beds have already been endowed so that free services and accommodations may be given to the deserving poor who reside outside of Santa Barbara.

JOURNAL OF DENTAL RESEARCH.—A prospectus of the *Journal of Dental Research*, a journal devoted to the advancement and dissemination of knowledge pertaining to the mouth, teeth, and their relation to the body as a whole, has been received. This journal will be issued quarterly, beginning with the March number; it is to be supported by an endowment fund; and it will be edited by eminent investigators in the fields of stomatology and dentistry, anatomy, anthropology, bacteriology, biochemistry and nutrition, endocrinology, evolution, hygiene, immunology, medicine, neurology, paleontology, pathology, pediatrics, pharmacology, and therapeutics, physiology, surgery, and toxicology.

Each volume will contain about five hundred pages of original research material. In addition, there will be supplementary pages devoted to the scientific proceedings of dental and stomatological societies. The *Journal of Dental Research* will aim to be of practical value to dentists and physicians.

BOSTON AND MASSACHUSETTS.

WEEK'S DEATH RATE IN BOSTON.—During the week ending May 3, the number of deaths reported was 259 against 275 last year, with a rate of 16.95 against 18.34 last year. There were 42 deaths under one year of age against 34 last year.

The number of cases of principal reportable diseases were: Diphtheria, 31; scarlet fever, 42; measles, 15; whooping cough, 48; typhoid fever, 1; tuberculosis, 65.

Included in the above were the following cases of non-residents: Diphtheria 7; scarlet fever, 1; measles, 2; tuberculosis, 4.

Total deaths from these diseases were: Diphtheria, 3; scarlet fever, 1; whooping cough, 1; tuberculosis, 24.

Included in the above were the following non-residents: Tuberculosis, 2.

Influenza cases, 48; influenza deaths, 10.

ARRIVAL OF MEMBERS OF DR. BALCH'S UNIT IN BOSTON.—Thirty-eight nurses, the last members to reach home of Unit Number 55, known in the Toul Sector in France as Dr. Balch's Unit, arrived in Boston recently and have been officially discharged from the army. These nurses were recruited from the Newton Hospital, the Anna Jaques Hospital of Newburyport, and the Massachusetts General Hospital. The entire Unit was composed of seventy nurses and thirty-five doctors. The surgeons were under the leadership of Dr. Balch, and the medical division was in charge of Dr. Daniel M. Hoyt. Miss Jessie Grant of Boston was the head nurse of the Unit. The only nurse of the Unit who lost her life in overseas service was Miss Grace Malloch, whose death was caused by influenza.

Obituary.**LOUIS WHITMORE GILBERT, M.D.**

A RECENT issue of the *Evening Transcript* announced the death of Dr. Louis Whitmore Gilbert of Brookline, and a sketch of his life and activities was presented, but it is our desire to pay a tribute to a fine, loyal friend which shall be more personal than this newspaper account.

It is not often that one meets in civil life the

bitter fight against odds that brings out so splendidly the sterling personal qualities that this brave boy displayed.

Louis Gilbert has gone West,—and for no soldier who gave his life in the great war was there more glory in the going. For Louis was a soldier of the finest type the world produces. A silent, cheerful, patient sufferer, who displayed the same quality of calm courage each day of his long illness that the trained soldier has to have as he goes into action.

As he sat in his chair before the window from day to day, watching the slow but steady increase of his disease, and knowing almost to an hour when to expect the end, his always cheerful smile became more and more gentle, and the light in his eyes fuller of courage and sweetness.

It takes a brave man to sit calmly and watch the slow, steady, inexorable spread of paralysis, that he knows full well is daily bringing the end nearer; but Louis was brave—I believe there are none braver—and he never flinched. His cheerfulness was inexhaustible, his keen interest in the activities of his friends a pleasing thing to see. He never mentioned his own condition, except in response to inquiries as to how he felt, and then his reply was invariably, "Feeling fine." On the other hand, he always inquired about all his friends and what they were doing; his interest and his loyalty and his friendly inquiries were the pleasing things in conversation with him.

To those of us whose privilege it has been to know Louis Gilbert well and to have watched him through his long and trying illness, the memory of his courage cannot but be an inspiration every time we think of him, to some attempt on our parts to imitate him in our own lives. And if misfortune should ever come to us as it did to Louis, we can have no finer example to follow than his splendid one. Louis had many warm and loyal friends, whose pleasure it was to keep him supplied with books and flowers and cigars, and whose frequent visits were a source of greatest pleasure and satisfaction to Louis, who was in turn one of the most loyal friends a man could have. He spoke ill of no man, but always found some pleasing thing to say of everyone he talked of.

It was a strange fact, due, I believe, to Louis' wonderful personality, that those of us who went to see him with the idea that we were

going to cheer him up always came away feeling very humble in the presence of a courage so fine, and brought with us the realization that it was Louis who had amused and brought cheer to us; not we who had done anything.

Now that Louis has gone, we miss those little visits; something real, something so fine that it took us a long time to comprehend the significance and the magnitude of it, has gone out of our lives. We miss the smile that was a true benediction; the evident pleasure at the little attentions given him. We feel a definite and distinct loss, that one so brave, one so cheerful, one so calm in the face of trouble should have gone from us.

These words are poor things to tell of the fineness of Louis' spirit; one had, however, but to see it once to feel its force and its absolute mastery over misfortune.

A brave soldier, a loyal friend, a physician whose patients knew his value and appreciated his sound judgment, and his faithfulness, has gone forever. Our tribute to him is a silent and a deep one.

E. H. R.

Correspondence.

PRECAUTIONS IN THE ADMINISTRATION OF ARSPHENAMINE.

Treasury Department,
United States Public Health Service,
Washington, May 3, 1919.

Mr. Editor:—

It appears that there is a lamentable want of care on the part of many physicians who administer arspenamine, as to the concentration of the drug used and the time required for administration.

The Hygienic Laboratory receives many complaints in regard to untoward results from the administration of arspenamine made by various American producers. When careful investigation is made, it is almost invariably found that the drug has been used in a solution that is too concentrated, and that it has been administered too rapidly. We have reports of a dose of 0.4 gm. being given in a volume of as little as 25 cc. and injected within 30 seconds. Such practice is abuse, not use, of a powerful therapeutic agent.

If, in addition to the usual precautions as to the use of perfect ampules and neutralization, physicians would give the drug in concentration of not more than 0.1 gm. to 30 cc. of fluid and allow a minimum of two minutes for the intravenous injection of each 0.1 gm. of the drug (in 30 cc. of solution), the number of reactions would be very materially reduced. This would necessitate from 90 cc. to 180 cc. of the solution for the doses usually given and would require from six to 12 minutes for the injection.

Any physician who fails to observe these precautions should be considered as directly responsible for serious results that follow the improper use of the drug.

Hoping you may find space in your JOURNAL for this letter, I am

Respectfully yours,
G. W. McCoy, Director.

ARTERIAL TENSION: A REJOINDER.

Boston, April 4, 1919.

Mr. Editor:—

In answer to the letter from Dr. G. Van N. Dearborn in your issue of April 3, I beg leave to submit:

My appraisal of the importance of measurements of the maximum tension of the radialis may be justly understood by considering the facts which I have reported in my article in the BOSTON MEDICAL AND SURGICAL JOURNAL of March 6, this year. During the last five months I have been ready to give information regarding technic to physicians desiring it.

Dr. Dearborn offers for discussion the term "normal human blood pressure." This complex term can, of course, be described only by defining with exactitude one or more of the several elementary qualities entering into the complex mentioned: the minimum, the various intermediaries, the maximum at a distinct locality of the arterial system. My report in the JOURNAL of March 6 relates only to the maximum tension of the radialis, which can be measured only by instruments constructed for that purpose (any instrument constructed for that purpose). Confusion should not be made with the various intermediary values (between minimum and maximum) which are observed by means of the brachial cuffs of different widths. There does not exist any constant equivalence between any of these intermediary values and the maximum. Each must be observed by its separate technic. The one of them can not be computed when the other is known.

In medical examinations, we are never so sure of our ground as when we make direct observation. Measurement of the maximum tension of the radialis artery (with the radialis arteriotonometer) is direct observation of a well defined biological fact. No one should give preference to values arrived at by computation or reasoning from less direct observation of fact that is less definable. Of course in this subject an observer who has had more experience can be of service to those who possibly may have had less opportunity. No one should think that I am not ready at any time to give of my experience in this matter to those who are willing to listen and to work.

It is only a question of locality (hospital) and formality. As for the formality, I am sure that Dr. Van N. Dearborn would not expect me to ring doorbells and solicit attention to one technic or another. Formality consistent with the dignity of scientific labor is the only condition *sine qua non* on my part.

Sincerely,

CLAES J. ENERBUSKE.

RECENT DEATHS.

DR EDWARD C. FROST, for many years a physician in Brockton, died on May 5. Dr. Frost was born in Sanford Maine, and was graduated from Dartmouth Medical School.

DR. FREDERICK RUSSELL STURGIS died in Boston recently at the age of seventy-five years. Dr. Sturgis was born in Manila, Philippine Islands, in 1844; he was educated in England, and later came to Boston and entered Harvard University. In 1867 he began practicing medicine in New York and became lecturer, and later a member of the faculty, of New York University. He retired from active professional life in 1912. Dr. Sturgis was a Fellow of the New York Academy of Medicine, a member of the American Medical Association, and of the Medical Society of the State of New York.